The fluctuation of plasma carotenoid concentrations by phase of the menstrual cycle: a controlled diet study

Author: Michele R Forman, Gary R Beecher, Richard Muesing, Elaine Lanza, Beatriz Olson, William S Campbell, Patricia McAdam, Elizabeth Raymond, Joseph D Schulman, and Barry I Graubard

Journal: Am J Clin Nutr 1996;64:559-65

Abstarct: This is the first controlled diet study to examine the fluctuation of plasma carotenoids, lipoproteins, and serum hormone concentrations by phase of the menstrual cycle. Non-smoking, premenopausal women *(n* = 12) with confirmed ovulatory cycles were given a standard diet with 10 mg total carotenoids/d for two cycles under isoenergetic conditions. Blood was drawn for simultaneous measurement of carotenoids, lipoproteins, and hormones on menses days 1-2, 4-6, 11 through 1 d after the luteinizing hormone surge, and 7-8 d after the surge, representing the menses, early and late follicular, and midluteal phases, respectively. Regression modeling with adjustment for plasma cholesterol concentrations was used to compare mean individual and total plasma carotenoid concentrations by phase of the cycle. Plasma carotenoid concentrations were at their lowest at menses and significantly higher thereafter, except for α-carotene. Compared with plasma concentrations at menses, β-carotene peaked (increased by 9%, $P = 0.01$) in the late follicular phase. Plasma lutein/zeaxanthin and anhydrolutein concentrations were higher by 8-11% *(*$P \leq 0.006$) and by 15-31% *(*$P \leq 0.02$), respectively, during the last three phases. Plasma lycopene and phytofluene concentrations peaked (increased by 12%, $P = 0.004$, and by 21%, $P = 0.006$, respectively) at the midluteal phase. This cyclic fluctuation may affect the estimation of the plasma carotenoid-disease relation in studies of premenopausal women.